

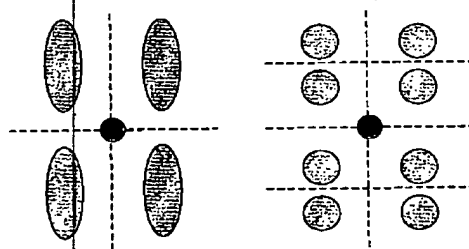
REMARKS

Claims 2, 6, 12-15 have been canceled, and claims 16-20 have been newly added by amendment. Claims 1, 3-5, 7-11, 16-20 are currently pending in the application.

Applicants gratefully acknowledge the telephonic interview held with the Examiner on the morning of Monday, February 9, 2004. In this interview, proposed amendments to the specification, claims and drawings were discussed and the results of this discussion are now embodied herein. The Examiner's suggested changes to the specification and drawing amendments have been made, and the Applicant's acknowledge the remark that the claims, as amended, appear worthy of examination on their merits.

Amendments to the specification are respectfully entered to more clearly emphasize the central point of the invention, and to correct typographic errors. The central point is the grouping of assay units into subunits, and these subsequently into individual units, such that a common supply reservoir serves all the assay units within an individual unit. This theme is stated in the paragraph on page 3, line 30 – page 4, line 5, and also page 13, lines 15 – 20, and the structure is described on page 3, lines 3-5, as well as being represented throughout the Figures.

The following illustrations also serve to highlight the symmetry and structure of the microfluidic systems that are the central point of the invention. Each grouping illustrates an individual unit, wherein the central black circle represents the central supply reservoir, and the blue ellipses or circles represent microfluidic channels and components. Fluidic connections between the central reservoir and the peripheral units are not shown for the sake of clarity. The ellipses



are arranged in a four-fold symmetric fashion, and each represents a subunit as defined by the invention. The blue circles represent a single assay unit, and each is related by an eight-fold symmetry. The dotted lines indicate mirror planes, that superimpose one element (ellipse or circle) onto another as by reflection. The fact that the microfluidic components are related by symmetry means that fluidic pathways are equidistant, transit times for reagents or substrates introduced into the microfluidic system are similar, equal applied voltages generate equivalent field strengths, detection points lie at fixed, periodic intervals within each individual unit and by extension, from

unit to unit in devices that are composed of multiple individual units. This symmetry and structure is found in all the Figures 1-3.

The next drawing highlights the relationship between the simple illustrations above and

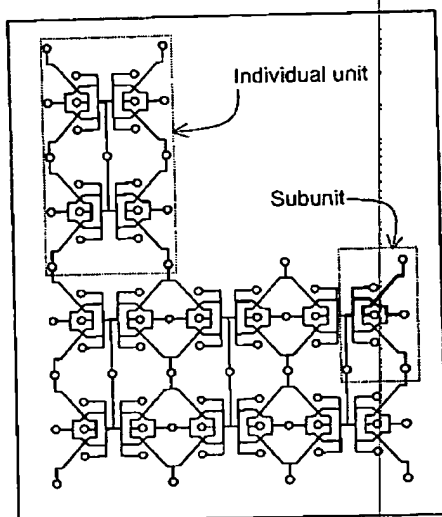


Figure 1B of the subject invention. An excerpt of the figure is presented, showing 4 individual units, each having the four-fold symmetric arrangement of subunits and the eight-fold symmetric arrangement of single assay units. The components of one individual unit are shown bounded by the dotted rectangle, likewise for one subunit. Within the highlighted subunit, the components associated with one of the two single assay units therein is drawn with bold lines. The symmetry relating those two single assay units is evident, as is the symmetrical relationship among subunits. The same basic structures are found in Figures 2A, 2C and 3B, demonstrating the symmetric layout and the guiding

principle of the fluidic designs.

Basis for the amendments to the specification are summarized in the table:

Amendment	Basis
Page 2, lines 7-10	Page 3, lines 3-5: ("a unit has 4-fold symmetry, and is divided into subunits having two assay units to provide a total of 8-fold symmetry in relation to a common supply reservoir", thus there are 4 subunits, and these subunits share one supply reservoir. Also, the figures 2c and 3b illustrate such a unit having 4 subunits, each having two assay units, and a single common supply reservoir.
Page 3, lines 3-12	There are four subunits that are symmetrically related, and thus better described as "quarter-units" rather than "half-units". "single assay unit": caption for Fig. 1a. Struck sentence is repetitive. "central supply reservoir": equivalent to common supply reservoir.
Page 3, line 27	Typographic correction.
Page 4, lines 17-20	Descriptions based on "half-units" are abandoned in favor of those

	based on "units" ("individual units").
Page 5, line 11	With a "unit" defined as having 8 single assay units (Page 3, lines 3-5), 12 such "units" would combine to provide 96 assays.
Page 5, line 14	Typographic correction.
Page 7, line 14	Typographic correction.
Page 7, line 15	Page 8, line 6.
Page 7, line 16	Typographic corrections.
Page 8, lines 4-13	Sentence moved for better narrative flow.
Page 8, line 19 – page 9, line 4	<p>Descriptions based on "half-units" are abandoned in favor of those based on "units" ("individual units").</p> <p>"Units" comprise eight "units of 100", e.g. single assay units (Page 3, lines 3-5).</p> <p>Elements are relabeled as described in Drawing Amendments section.</p> <p>There are four subunits that are symmetrically related, and thus better described as "quarter-units" rather than "half-units"; "quarter-unit 156" is equivalent to "subunit 156".</p> <p>"...or as part of <u>individual</u> unit 156 154.": typographic correction.</p> <p>"available to the shared..." aligns the description to being based upon an "individual unit" that is "repeated across two rows and six columns" (earlier in paragraph).</p> <p>Sentence "In addition, there is ..." struck because it repeats an earlier statement, page 8, line 25.</p>
Page 9, line 9	Figure 2c.
Page 9, line 12	Typographic correction.
Page 10, line 4	Page 11, line 23; and included by amendment in Fig. 3a.
Page 11, line 19	Typographic correction.
Page 11, line 28 – page 12 line 10	<p>four eight : Typographic correction.</p> <p><u>300</u>, as shown in Fig. 3a: 300 is illustrated in Fig. 3a.</p> <p>present as four half-units: not indicated in the figure.</p> <p>330: not indicated in the figure.</p>

The amended and new claims generally track the original claims, with changes entered to more clearly state the invention especially with regard to the amendments entered in the specification.

Specific basis for terms used in the amended and new claims are as follows:

Claim	Term/Phrase	Basis
1, 8, 16, 18, 19	individual unit	Page 2, line 8; Page 2, line 30; Page 3, line 2.
1, 18	subunit	Page 2, line 8, line 9; Page 3, line 4.
1, 3, 8, 18	common supply reservoir	Page 2, lines 9-10 ("share a single supply reservoir"); Page 3, line 5. Referred to synonymously as "reagent reservoir": Page 7, line 12; Page 8, line 25.
1, 8, 18, 20	target compound	Page 7, line 11-12.
1, 8, 18	compound reservoir	Page 7, line 13, line 27.
1, 8, 18	test compound	Page 3, line 9, line 28; Page 7, line 26.
1, 8, 18	connected (e.g. 'channel connected to reservoir')	Page 3, line 14-15.
1, 8, 18	assay mixture	Page 3, line 25, line 27.
1, 8, 18	transported	Page 3, line 27.
1, 8, 18	buffer reservoir	Page 3, line 14; Page 7, line 20.
1, 8, 18	waste reservoir	Page 3, line 15; Page 7, line 20.
1, 8, 18	detection	Page 3, line 28 ('detector'); Page 4, line 27; Page 6, lines 9-14.
5, 10	96 assay channels	Page 2, line 14; Page 5, lines 11-14; Page 7, line 10; Page 8, line 20; Fig. 1B.
17	384 assay channels	Page 2, line 14; Page 5, lines 11-14; Page 9, line 6, Fig. 2A.
16	12 of said units	Page 5, line 11 (as amended); Fig. 1B.
18	multiple assays	Page 2, line 10 ("total of 8 determinations"), line 14 ("chips are provided ... for a 96- or 384-assay or higher assay format").
18	assay involving a target compound and a test compound	Page 6, lines 25-26 ("involves mixing two entities"); Page 7, lines 11-12.

18	product	Page 7, line 28, line 30; Page 8, line 13.
18	injecting	Page 3, line 25; Page 8, line 8.
19	control assay	Page 4, line 4.
20	target compound is an enzyme	Page 6, line 17; Page 7, line 24.

No new matter has been added by the amendments. Reconsideration of the application is respectfully requested.

Rejections Under 35 U.S.C. 112

The Examiner rejected claims 1-15 under 35 U.S.C. 112, first paragraph as containing subject matter which was not adequately described in the specification. Applicants respectfully disagree with this rejection, particularly in view of the amendments. The Examiner cites specific instances within the specification in support of this view, each of which is addressed below.

The Examiner states there is no figure labeled 1A or 1B. In Fig. 1, labels distinguishing part A and part B have been added by amendment of the drawings.

The elements cited in the written description but not included in the original figure have been added in the amended drawing. The basis for each element is as follows: reagent reservoir 102, present in Fig. 1b; delivery channel 104, described on page 7, line 12; detector 122, described on page 7, lines 21-22 and page 8, lines 13-15; incubation channel 105, described on page 7, lines 14-16.

The portions of the written description that appear to conflict with the structure illustrated in Fig. 1A, as cited by the Examiner, were due to typographical errors now corrected by amendment to the drawings of Fig. 1A. Buffer reservoir 118 is now labeled correctly with a "B". Reagent reservoir 102 is now indicated in the figure, and labeled correctly with an "E".

The apparent internal conflict in the description on page 8, lines 4-6 as cited by the Examiner is inferred to be between the words italicized in the Office Action, "reagent reservoir 102" and "enzyme". Earlier in the specification, page 7, lines 23-27, the described scenario is introduced as based on an enzyme as a target compound, and the "enzyme in an appropriate buffer is introduced into reagent reservoir 102...". Also, the elements 102, 104 and 105 are now labeled by amendment to the drawings.

The Examiner also cites a lack of clarity within the descriptions on page 8, lines 14-18, line 20 and Fig. 1B. The terminology of "half-units" has been removed by amendment for clarity, in favor of the description of "units", "subunits" and "single assay units". A general description of

"units" is found in the following: "The units 154 are ~~four-eight~~ units of 100 organized so as to share the maximum number of channels and reservoirs compatible with the purpose for which the device is used." (Page 8, lines 21-23), wherein the units 100, shown in Fig. 1A, are equivalently referred to as "single assay units". Alternative "units" are illustrated in Figs. 2C and 3B, again wherein a common supply reservoir supplies the reagent to eight single assay units. The unit for the device of Figure 1 is now more clearly depicted in part B by amendment to the drawing.

In view of the above amendments, Applicants respectfully request that the above rejection be withdrawn.

The Examiner also rejected claims 1-15 under 35 U.S.C. 112, second paragraph as being indefinite for failing to distinctly claim the subject matter. Applicants respectfully disagree with this rejection, particularly in view of the amendments.

The Examiner's comments are directed specifically at claims 1, 2, 6, 8, 12, 13, 14 and 15. Of these, claims 2, 6, 12, 13, 14 and 15 have been canceled. Claims 1 and 8 have been amended to (a) remove the offending language "as required" and "waste sources", (b) include the structural relationship between and among the various elements, and (c) remove the recitation regarding the disposition of the waste sources.

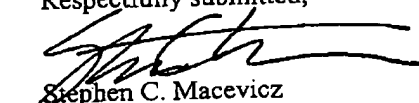
In view of these amendments, Applicants respectfully request that the above rejection be withdrawn.

The Examiner also rejected claim 12 under 35 U.S.C. 101 as not being a proper process claim. Applicants have canceled this claim without prejudice, and accordingly respectfully request that this rejection be withdrawn.

For the above reasons, Applicants submit that any basis for rejection has been overcome by amendment and respectfully request that it be withdrawn, and that the claims be allowed and the application quickly passed to issue.

If any additional time extensions are required, such time extensions are hereby requested.
If any additional fees not submitted with this response are required, please take such fees from
deposit account 50-2266.

Respectfully submitted,



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Enclosures:
Replacement sheets of drawings